

# Childbirth or termination of pregnancy: does paid employment matter? A population study of women in reproductive age in Norway

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## Key words

Childbirth, employment, population study, risk factors, termination of pregnancy

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## Conflict of interest

The authors have stated explicitly that there are no conflicts of interest in connection with this article.

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## Abstract

**Introduction.** We studied whether female paid employment is associated with pregnancy outcome; childbirth or pregnancy termination. **Material and methods.** All women in Norway, 16–54 years of age, during the years 2007–10 were included. Data sources were; the Norwegian Central Person Registry, the Medical Birth Registry of Norway, and the Registry of Pregnancy Termination. We compared the proportion without paid employment among all women, women who gave birth, and among women who requested termination of pregnancy. Thereafter, and among pregnant women, we estimated the odds ratio for pregnancy termination request for women without paid employment by applying logistic regression analyses, using women with paid employment as reference. **Results.** Among all women 16–54 years of age, 23.5% were without paid employment. Among women who gave birth, 15.8% were without paid employment, whereas this proportion was 46.4% among women who requested pregnancy termination ( $p < 0.05$ ). Among the 307 512 women who were pregnant, 60 734 (19.4%) requested pregnancy termination. The odds ratio for pregnancy termination request was 3.18 (95% CI 3.11–3.25) for women without paid employment. Adjustments were made for age, number of children, and region of residence in Norway. **Conclusion.** Being without paid employment was more common among women in the general population and among women requesting pregnancy termination than among women who gave birth. Hence, women seem to have children when they are in paid employment. The role of women's paid employment for reproductive choices should be further investigated.

**Abbreviations:** OR, odds ratio.

## Introduction

Reproduction is essential for population maintenance. Hence, knowledge about factors that influence reproduction is important. The demographic transition to fewer children per woman has been explained by altered preferences for women, from childbearing and childrearing to education and paid employment. Hence, high educational

## Key Message

Among pregnant women in Norway (2007–10), women without paid employment had more than a threefold increase in odds ratio for pregnancy termination compared with women with paid employment. Women seem to have children when they are in paid employment.

and employment levels among women have been linked to low fertility rate (1). The fertility patterns in many European countries today support the hypothesis of altered preferences for women. The educational and employment levels are high, whereas the fertility rate is low and below replacement level (2).

However, the inverse associations of educational and employment levels with fertility rate have been questioned, because the decrease in fertility rate occurred before the increase in women's level of education and employment (3). In the Western world, well-educated women and women with high income seem to have more children than women with lower education (4). Pregnancy termination has been associated with no or low family income (5), which may also suggest that childbirth occurs while being in paid employment.

Parental leave benefits after childbirth have been assumed to increase the fertility rate. The relatively high fertility rates in Scandinavian countries, compared with many other European countries, have been used to illustrate this. The parental leave benefits in Norway are generous and the fertility rate is among the highest in Europe (2). A woman with paid employment receives full economic compensation from the National Insurance for 49 weeks [46 weeks in 2009 (6)] while taking care of her infant (7). However, the right to parental leave benefits in Norway is closely linked to the woman's employment. Without paid employment 6 months before childbirth, a woman receives a tax-free lump sum transfer only (8). Hence, the right to parental leave benefits may further encourage childbirth while having paid employment. It may therefore be proposed that women without paid employment choose not to become pregnant, and that they request pregnancy termination if they become pregnant.

We aimed to study whether female paid employment is associated with reproductive patterns. We compared the proportion of women in Norway without paid employment; among all women in reproductive age, among women with childbirth, and among women who requested pregnancy termination. Additionally, and among the pregnant women, we estimated odds ratio (OR) for pregnancy termination request associated with having no paid employment.

## Material and methods

The study included all women of reproductive age, 16–54 years old, in Norway during the period 2007–10.

To obtain information about the proportion of all women, 16–54 years of age, who were without paid employment, we used population statistics from the Norwegian Central Person Registry (9). Paid employment was

defined as having yearly personal income above the tax-free income (more than 39 950 Norwegian kroner/€4327.90) (10). The Central Person Registry is administered by the Norwegian Taxation Authorities. We present the mean proportion of women without paid employment across the years 2007–10.

To obtain information about the proportion of women without paid employment among women with childbirth, we used data from the Medical Birth Registry of Norway with individual linkage to the Norwegian Central Person Registry. All births in Norway are reported to the Medical Birth Registry by law (11). The unique person identification number given to all individuals living in Norway enabled the link to be made between the Medical Birth Registry and the Norwegian Central Person Registry (12) and made it possible to obtain information about individual income. Information about income was available throughout the year 2010. Paid employment was defined as having personal income above tax-free income (10) during the year of childbirth. Parental leave benefits (above the tax-free lump sum transfer), may be included in the income during the year of childbirth.

For women who requested pregnancy termination, we obtained information about paid employment from the Registry of Pregnancy Termination, to which all requests for pregnancy termination are reported by law. The Norwegian Institute of Public Health administers this registry, and since 2007 the reporting has been performed electronically (13,14). In Norway, pregnancy termination is performed on the woman's request within pregnancy week 12. In our study, only requests within pregnancy week 12 were included, representing 95% of all requests for pregnancy termination (13). Pregnancy termination is performed or initiated in hospitals, by law. The Registry of Pregnancy Termination includes individual, but anonymous data that are obtained by a standardized patient journal (15) completed by the doctor at the clinical examination, typically 1–5 days before the pregnancy termination. In the standardized patient journal, the answer categories regarding paid employment were mutually exclusive and included; having presently full-time work/part-time work/student/housewife/working without payment/disabled/seeking employment. We defined paid employment as having full-time or part-time work (coded: yes or no). We had no information about level of income.

To link individual data from the Medical Birth Registry with data from the Central Person Registry we obtained approvals from the Norwegian Data Inspectorate, the Regional Committee for Medical, and Health Research Ethics, Eastern Norway, the Ombudsman for the Protection of Personal Data, and the Norwegian Social Science Data Services (Reference number: 603-07276a

1.2007.2366). The Norwegian Institute of Public Health recommended that the Registry of Pregnancy Termination could be used for our study (Reference number: MFR 12-1555), and the Norwegian Data Inspectorate was notified. The data files that we used did not include personal identification numbers. Hence, all women included in our study were anonymous to the researchers.

We present the number and proportion (%) of women without paid employment among; all women in Norway, 16–54 years of age, women who gave birth and women who requested pregnancy termination. We tested for differences in the proportion without paid employment between groups by applying a chi-squared test. Additionally, and by applying logistic regression analysis, we estimated crude and adjusted OR for pregnancy termination request associated with having no paid employment. In these analyses, we included all pregnant women (women with childbirth and women who requested termination of pregnancy) with available information on all of the study factors. Our main exposure variable was paid employment (yes/no). We made adjustments for the following factors that could be associated with both paid employment and pregnancy termination and so be confounding factors; age [ $<20$ , 20–24, 25–29 (reference), 30–34, 35–39,  $\geq 40$  years old], number of children [0 (reference), 1, 2,  $\geq 3$ ], region of residence in Norway [Oslo/the capital (reference), middle, east, west, south, north] and year of childbirth/request for pregnancy termination [2007 (reference), 2008, 2009, 2010]. Information about these study factors was obtained from the Medical Birth Registry and the Registry of Pregnancy Termination. We could include in the analyses study factors that were available in both registries only.

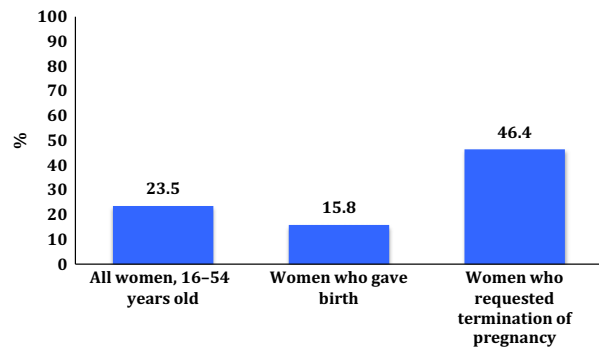
## Results

In total, there are approximately 1.3 million women 16–54 years of age in Norway. During the years 2007–10, 23.5% (mean per cent across the years 2007–10, range 22.0–24.8%) of these women were without paid employment.

Among all women of reproductive age, 312 773 women either gave birth or requested pregnancy termination during the years 2007–10. Among these, 5261 women were excluded from further data analyses due to lack of values for one or more study factors.

Among the 307 512 women in our study, 246 778 gave birth. Their mean age was 29.8 years [standard deviation (SD) 5.3 years], and 15.8% were without paid employment.

There were 60 734 requests for pregnancy termination, and the mean age of the women with pregnancy termination request was 27.5 years (SD 7.1 years). A total of



**Figure 1.** Proportion (%) of women in Norway without paid employment among all women ( $n = 1\,194\,000$ ), among women who gave birth ( $n = 39\,096$ ) and among women who requested termination of pregnancy ( $n = 28\,175$ ) during the period 2007–10.

46.4% of these women were without paid employment (Figure 1). The difference between the groups in the proportion of women without paid employment was statistically significant ( $p < 0.05$ , chi-squared test).

Among pregnant women, the crude OR for pregnancy termination request was 4.60 (95% CI 4.51–4.69), for women without paid employment using women with paid employment as the reference (Table 1). The corresponding adjusted OR was 3.18 (95% CI 3.11–3.25). There was a U-shaped association of age with pregnancy termination, so 57.3% of pregnant women  $<20$  years of age, and 33.9% of pregnant women  $\geq 40$  years of age requested pregnancy termination. Only 11.4% of the pregnant women 30–34 years of age requested pregnancy termination. The adjusted ORs for pregnancy termination request were 5.04 (95% CI 4.83–5.26) for women  $<20$  years of age and 2.14 (95% CI 2.04–2.24) for women  $\geq 40$  years old, using 25–29 years of age as the reference. Having two children or more was also associated with increased OR for pregnancy termination request.

## Discussion

Among pregnant women in Norway during the years 2007–10, women without paid employment had a more than threefold increase in OR for pregnancy termination compared with women with paid employment, after adjustment for age, number of children, and region of residence. Being without paid employment was also more common among women of reproductive age in general, than among women with childbirth.

Our study included all women of reproductive age, all women with childbirth, and all women with request for pregnancy termination in Norway. Hence, biased estimates due to skewed selection are unlikely. Among all women of reproductive age and women who gave birth,

**Table 1.** Crude and adjusted odds ratios (ORs) with 95% CIs for pregnancy termination request among pregnant women in Norway during the period 2007–10.

	Total n = 30 7512	Pregnancy termination		Childbirth		Crude OR		Adjusted OR	
		n = 60 734	%	n = 246 778	%		95% CI		95% CI
<b>Paid employment</b>									
Yes	240 241	32 559	53.6	207 682	84.2	Reference		Reference	
No	67 271	28 175	46.4	39 096	15.8	4.60	4.51–4.69	3.18	3.11–3.25
<b>Age (years)</b>									
<20	13 617	7808	12.8	5809	2.4	7.67	7.37–7.97	5.04	4.83–5.26
20–24	53 152	16 998	28.0	36 154	14.6	2.68	2.61–2.75	2.58	2.51–2.65
25–29	89 314	13 322	21.9	75 992	30.8	Reference		Reference	
30–34	91 050	10 429	17.2	80 621	32.7	0.74	0.72–0.76	0.70	0.67–0.71
35–39	48 823	8259	13.6	40 564	16.4	1.16	1.13–1.20	0.94	0.91–0.97
≥40	11 556	3918	6.5	7638	3.1	2.93	2.80–3.05	2.14	2.04–2.24
<b>Number of children</b>									
0	13 5016	30 112	49.6	104 904	42.5	Reference		Reference	
1	99 013	11 825	19.5	87 188	35.3	0.47	0.46–0.48	0.73	0.71–0.75
2	50 201	11 895	19.6	38 306	15.5	1.08	1.06–1.11	2.01	1.96–2.07
≥3	23 282	6902	11.3	16 380	6.7	1.47	1.42–1.51	2.25	2.16–2.33
<b>Region of residence</b>									
Oslo/capital	53 619	12 290	20.3	41 329	16.7	Reference		Reference	
Middle	37 759	5849	9.6	31 910	12.9	0.62	0.60–0.64	0.50	0.48–0.52
East	67 568	14 579	24.0	52 989	21.5	0.93	0.90–0.95	0.82	0.80–0.85
West	66 407	10 927	18.0	55 480	22.5	0.66	0.64–0.68	0.55	0.53–0.57
South	53 856	10 749	17.7	43 107	17.5	0.84	0.81–0.86	0.68	0.66–0.70
North	28 303	6340	10.4	21 963	8.9	0.97	0.94–1.01	0.73	0.70–0.75
<b>Year of childbirth/pregnancy termination</b>									
2007	71 946	12 603		59 343		Reference		Reference	
2008	77 742	16 156		61 586		1.24	1.20–1.27	1.26	1.22–1.30
2009	79 179	16 069		63 110		1.20	1.17–1.23	1.23	1.19–1.27
2010	78 645	15 906		62 739		1.19	1.16–1.23	1.23	1.19–1.26

the definition of paid employment was yearly income above the tax-free income, as recorded by the Norwegian Taxation Authorities (more than 39 950 Norwegian kroner/€4327.90). For women who requested termination of pregnancy, the definition of paid employment was having full-time or part-time work as reported to the Registry of Pregnancy Termination. This difference in the definition of paid employment may have biased our estimates. However, it is likely that the women, who requested pregnancy termination and had full-time or part-time work, also had an income above tax-free income. Hence, they fulfilled the definition for the other women in our study of having paid employment, and misclassification of paid employment is unlikely to have occurred. We had no information about level of income among women with a request for pregnancy termination, so we could not compare income between groups.

Some of the women with a request for pregnancy termination may not have had the termination performed. Also, some women may have had more than one reproductive event during our study period. As our data were

anonymous, we could not identify these women. We used information about employment status at the time of the reproductive event in our analyses. There is little reason to believe that there have been more recurrent pregnancy terminations than childbirths according to employment status, and that the extent of such a possible bias would have altered the direction of our estimate.

We could only include in our analyses study factors that were available in the registries. We made adjustment for age, number of children, year of reproductive event, and region of residence. Unfortunately, we had no information about the country of birth for the women who requested pregnancy termination. Hence, we do not know whether the association of paid employment with reproductive outcome is valid across ethnic background. In Norway, non-Western women are over-represented among women with childbirth (16) and among women with pregnancy termination, suggesting a higher pregnancy rate in non-Western women (17). Non-Western women living in Norway are also more often unemployed than women who are born in Norway (18). We had no

information about mental health, partner status, or social network, factors that also may be associated with both reproductive pattern and paid employment. It could also be argued that no adjustment should be performed, because the relations of different factors with paid employment and with reproduction are not well known.

Recent studies suggest that termination of pregnancy may be linked to low education (19), low social status (20), age (19), and foreign origin (17,21). These factors are also closely linked to low or no income. We are not aware of any previous population studies of the association of paid employment with pregnancy termination among women who are pregnant. A study in Oslo, Norway during 2000–02, suggested that Pakistani women with low education had more children and fewer pregnancy terminations than women with high education (19). Norwegian born women displayed an opposite pattern. It is likely that high education is related to having paid employment. If that is true, the association of paid employment with childbirth may differ across ethnic groups within one country.

Generally, women in Norway have high educational level and high level of employment (18). In our study, 84% of women with childbirth were in paid employment, and this proportion was higher than in the general population of women of reproductive age. Our findings therefore suggest that women choose to give birth when they are in paid employment. The fertility rate in women <30 years of age has declined since the beginning of the 1970s, and the fertility rate in women >30 years has increased (22). These observations strongly suggest that women have delayed childbearing and choose to have children when they are in paid employment. Hence, women's income may have become increasingly important for the economic support of children.

In our study, particularly women with childbirth were in paid employment. This finding could not be explained by age differences between women with and without childbirth. Our findings therefore suggest that there may be a selection for childbirth by women who are in paid employment. One mechanism behind such selection could be that women without paid employment more often terminate their pregnancy than women with paid employment.

In addition to having a stable income, the right to parental leave benefits may encourage women to have their childbirths while in paid employment. In Norway, only women with paid employment have the rights to the generous parental leave benefits. The mother or the father may receive full economic compensation for 49 weeks (7) [46 weeks in 2009 (6)] from National Insurance. The National Insurance compensates for a yearly income up to 530 220 Norwegian kroner [€57 440.31 in 2014;

€4696.14 in 2009 (6)] (23). If the mother is without paid employment, she receives a tax-free lump sum transfer only, 38 750 Norwegian kroner [€4197.90 in 2014, €3765.60 in 2009 (6)] (8).

Parental leave benefits vary largely across the world (24). The parental leave benefits in Norway and in other Scandinavian countries have been used to explain the relatively high fertility rates in the Scandinavian countries compared with many other European countries. Comparisons of national fertility rates according to parental leave benefits do not provide sufficient evidence for understanding the effects of parental leave benefits. Our findings could suggest that parental leave benefits discourage childbirth in women without paid employment. Our findings should encourage further studies about whether parental leave benefits influence reproductive choices independent of income level.

In our study of all women in Norway during 2007–10, 84% of the women with childbirth were in paid employment. Pregnant women without paid employment had more than a threefold increased OR for pregnancy termination. The role of maternal employment and parental leave benefits on reproductive choices should be further investigated.

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